AN HISTORICAL DEVELOPMENT OF THE ORGANIZATIONAL STRUCTURE OF AIR FORCE CIVIL ENGINEERING PRIME BASE ENGINEER EMERGENCY FORCES (BEEF) FROM 1964 TO 1978

THESIS

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Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the

Requirements for the Degree of

Master of Science in Engineering Management

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September 1987

Acknowledgements

There are several people who were instrumental in the completion of this thesis. First, I would like to thank Dr. Freda Stohrer, my thesis chairman, for the many hours she spent reviewing and commenting on my research. Her help was invaluable to the completion of this research. Next, I would like to thank Dr. Jerome Peppers, my reader, whose initial comments quickly educated me on how this type of research must be conducted. My eternal thanks go to both these fine people who persevered with me throughout this thesis effort.

I would also like to thank the staff of the USAF Historical Research Center at Maxwell AFB, Alabama. Without their help, I would not have been able to find the documents necessary for this research.

Finally, I want to thank my wife, Joena, for her understanding and patience on those many days and nights when I was tied to my word processor.

Ronald D. Marlin

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Abstract

This thesis provides a detailed history and analysis of the organizational structure of Air Force Civil Engineering (AFCE) Prime Base Engineer Emergency Forces (BEEF) from its beginning in 1964 to its first restructuring in 1979. The research covers both primary and secondary documents on AFCE. The findings are presented in four chapters: 1) the rationale behind the Prime BEEF organizational structure as defined by the factors considered by the Project Prime BEEF study group is discussed; 2) the structure and mission of each of the five Prime BEEF teams is outlined; 3) the experiences with the Prime BEEF organizational structure in Santo Domingo, Vietnam, and selected natural disasters are described and analyzed; and 4) the conclusions and lessons learned are presented. Following a summary of recommendations, the results that AFCE planners design a Prime BEEF organizational structure which allows for flexibility, logistics supportability, and unit integrity are presented.

AN HISTORICAL DEVELOPMENT OF THE ORGANIZATIONAL STRUCTURE OF AIR FORCE CIVIL ENGINEERING PRIME BASE ENGINEER EMERGENCY FORCES (BEEF) FROM 1964 TO 1978

I. Introduction and Methodology

Overview and Justification

This research provides a detailed history of Air Force Civil Engineering (AFCE) Prime Base Engineer Emergency Forces (BEEF) and analyzes its organizational structure from Prime BEEF's beginning in 1964 to its first restructuring in 1979. Events prior to 1964 leading to the development of Prime BEEF also are discussed.

It is a truism that a knowledge of history can help us avoid repeating mistakes made in the past. Baruch Fischhoff, author of For Those Condemned to Study the Past: Reflections on Historical Judgement (13), comments on the repetitive nature of history:

> While the past never repeats itself in detail, it is often viewed as having repetitive elements. People make the same kinds of decisions, face the same kinds of challenges, and suffer the same kinds of misfortune often enough for behavioral scientists to believe that they can detect recurrent patterns (13:2).

The study of history applies directly to the military insofar as knowledge of the history of the Air Force helps Air Force managers make timely decisions today.

To that end, two excellent overviews of Air Force Civil Engineering (AFCE) history are available: Colonel Floyd A. Ashdown's A History of Warfighting Capabilities of Air Force Civil Engineering: Research Report (3) and A History of Air Force Civil Engineering Wartime and Contingency Problems from 1941 to the Present by Captain Dean L. Waggoner and Captain M. Allen Moe (33). However, these studies do not include detailed information on many areas of AFCE, such as Prime BEEF. Captains Waggoner and Moe identify the evolution of Prime BEEF as an area for further research (33:24).

In addition, the Air Force Directorate of Engineering and Services, HQ USAF/LEE, is currently using historical research as one tool in the development of AFCE doctrine. I hope that the research presented here will assist them in that effort.

Specific Research Problem

This research was conducted to provide a detailed history and analysis of the organizational structure of Prime BEEF from its beginning in 1964 to its first restructuring in 1979.

Investigative Questions

The following questions were used in conducting this research:

1. What events prompted the development and implementation of the initial Prime BEEF organizational structure?

2. What was the rationale behind the initial Prime BEEF organizational structure?

3. What was the initial Prime BEEF organizational structure?

4. What were some of the problems and experiences with this organizational structure?

5. What lessons can be learned from Prime BEEF's experiences during this period (1964-1978)?

Methodology

This research covers both primary and secondary sources relating to AFCE Prime BEEF. First, the materials available at the Air Force Institute of Technology School of Engineering and School of Systems and Logistics libraries at Wright-Patterson Air Force Base were reviewed. The main sources of information in these libraries were back issues of the Air Force Civil Engineer and the Air Force Engineering and Services Quarterly.

Concurrently, several topical searches were conducted through the Defense Technical Information Center (DTIC) which, for the most part, turned up only minor source materials.

Last, the archives of the United States Air Force Historical Research Center and the Air University Library provided the bulk of the raw data used in this study. The Historical Research Center was the main source of the primary documents used in this study: end-of-tour reports,

unit histories, command histories, and other documents. The information found at the Historical Research Center was invaluable to this study.

Presentation

This thesis presents the history of the initial organizational structure of Prime BEEF in three chapters: 1) the rationale behind the organizational structure; 2) a description of the organizational structure; and 3) experiences of Prime BEEF in Santo Domingo, Vietnam, and during natural disasters. The last chapter of this thesis summarizes the lessons learned during the initial implementation period (1964-1979).

II. Rationale Behind the Organizational Structure

Project Prime BEEF (Base Engineer Emergency Forces), a Civil Engineering Manpower Study Group, was the catalyst in the implementation of Prime BEEF. The group consisted primarily of personnel from the Directorate of Civil Engineering, but consultants from the Director of Manpower and Organization, the Director of Personnel Planning and the Director of Personnel Procurement and Training were on call and participated in discussions (27:1). In December 1963 this group met to examine this question:

> Is the present Civil Engineer Force properly aligned and is the distribution of this resource adequate to perform the essential real property facility functions in support of the Air Force mission today and tomorrow? (27:3)

Lieutenant Colonel William T. Meredith (later Brigadier General), chairman of the Project Prime BEEF study group, answered this question with a resounding "NO" (23:2). As the study group considered these questions of AFCE force alignment and distribution, they were also asked "to create a capability, within existing resources, to respond to emergencies" (273).

Before the Project Prime BEEF study group could answer the driving question of alignment above, they had to consider the current state of AFCE in view of its increasing direct combat support role. Problems plaguing AFCE at this time included the following: 1) AFCE had no appreciable

mobile response capability for contingencies; 2) AFCE lacked uniformity in the military/civilian mix from base to base; 3) AFCE provided inadequate career progression for military members, and 4) AFCE had shown itself improperly aligned to meet several pre-1964 crises (27:6-8). A complete listing of the conditions and problems the Project Prime BEEF group considered can be found in Appendix B.

Direct Combat Support Role

As the Project Prime BEEF study suggests, Air Force facility maintenance had changed considerably since World War II (23:2). The increasing complexity of weapon systems and their growing dependence on sophisticated facilities made adequate Civil Engineering support essential to their operation (23:2). Lieutenant Colonel Meredith describes AFCE's responsibilities:

> CE now has a direct combat support role. Major weapon systems, such as ICBM's [Intercontinental Ballistic Missiles] and the DEW [Distant Early Warning] line, are dependent on Civil Engineering support. The Civil Engineer is intimately involved in limited war operations. Aircraft are more sophisticated, their engines can be ripped apart by poor or improperly maintained runways; therefore, Civil Engineering units must be able to support the aircraft with the type of facilities they require when they are redeployed to meet emergencies (23:2).

Admittedly, facility maintenance always had been vital to mission success, but it became absolutely critical with the introduction of these increasingly complex and facility dependent weapon systems. For example, as aircraft grew in

complexity, they needed smoother runways/taxiways which could tolerate heavier loads. Furthermore, the increasing complexity of aircraft electronics required facilities with stringent temperature and humidity controls. Such increasing dependence had made the facility and its required maintenance part of the weapon system.

Understanding this facility dependence, the study group concluded that AFCE could not provide adequate support during combat, especially when weapon systems were subject to deployment (23:2). For example, an F-4 squadron at a continental United States (CONUS) base might be programmed to move to and fight out of a European base. AFCE, at this time, however, was not organized for mobility. Hence, if a flying unit was deployed, there were no plans for a concurrent AFCE deployment. Therefore, such a deployment of AFCE personnel for the required engineering support would have been difficult and disorganized. This inability provided the primary impetus for Prime BEEF.

Reflecting on Prime BEEF's direct combat support role, Major General Robert H. Curtin, director of AFCE during this time, said that "the Prime BEEF program was initiated to provide responsive, compact temporary duty (TDY) Civil Engineering forces of specific military skills for direct support of short-term combat operations. . ." (7:1). In summary, Prime BEEF was intended to provide AFCE with a means for adequate and timely combat engineering support.

Military/Civilian Manpower Mix

Giving AFCE a direct combat support role had other implications. According to AFR 26-10, "military personnel will be used in combat, and direct combat support jobs, and civilians in indirect combat support assignments" (23:2). In other words, if AFCE personnel were needed only for indirect combat requirements, no military personnel were required. AFCE has a direct combat support role given that aircraft cannot take off and land on damaged runways and given that AFCE is responsible for damaged runway/taxiway repair and maintenance. This direct combat role needed to be formalized through Prime BEEF. Note the following comments from the Project Prime BEEF report:

> The Air Force has experienced a continuous flow of Congressional inquiries relative to the use of civil engineering manpower resources. The Air Force has not been in the position to provide substantive replies to the satisfaction of members of Congress on the role and use of our military and civilian manpower (27:7).

The Project Prime BEEF study must have provided Air Force officials with some much needed ammunition to answer Congressional inquiries.

Alignment of AFCE's Manpower Resource

Four pre-1964 contingencies indicated that AFCE was improperly aligned to respond to emergencies. Colonel Ashdown succinctly describes the difficulties encountered when an unprepared, inadequate base was required to support a sudden enormous increase in mission:

The first contingency occurred in Lebanon in 1958. The elected government of Lebanon was in danger of being overthrown. On 15 July 1958, President Eisenhower deployed 5000 US Marines to Lebanon to preserve stability in the region. USAF was to use Adana, Turkey as a staging base to move people and supplies into Lebanon. The facilities at Adana were not designed to handle t' . increase in mission. In fact, the base had problems even before the crisis developed. The water supply was inadequate to support the small permanent base population. Limited facilities were available, and POL [petroleum, oils, and lubricants] and generator problems were a daily concern of the Base Engineer. In addition, operations and maintenance was accomplished by a new civilian contractor who had only been on the job 15 days when the Lebanon intervention was announced. The contractor's force at Adana was not sized to support the around-the-clock contingency operation that ensued. The Air Force had no system to deploy military engineers to Adana to provide assistance.

As more people arrived at the base and aircraft operations increased, airfield pavements needed repair, base facilities were overcrowded, and utility systems were becoming severely overloaded. Through extraordinary efforts, the maintenance contractor drew skilled technicians from other contract sites to supervise local foreign national laborers temporarily hired to support 24-hour operations. Emergency generators from other bases in the theater were shipped in to provide additional power. Tents provided living accommodations for the personnel overflow.

Water shortages became critical, and Army Engineer assistance was requested. It was only after extreme measures were taken to divert one engineer unit which was in the process of rotating back to the United States that Army assistance was provided. The Army engineers constructed a four-inch pipe water line which helped to alleviate the water supply problem. It is worthy to note that this was the only assistance provided by the Army. Everything else was done by AFCE resources which highlights how dependent the Air Force had become on a civilian contractor. Had the Lebanon crisis required the use of more than one staging base and required increased engineering support at

several bases in the theater, AFCE may not have been able to adapt as readily as it did at Adana (3:35-36).

The problems with depending on civilian contractors or the Army during the Lebanon crisis prompted the United States Air Forces in Europe (USAFE) to develop its own Civil Engineer Mobile teams under the direction of Colonel Winston C. Fowler (3:37). The program is briefly described below:

> In essence this plan designates certain CE personnel within the command as Mobile Team members. When an emergency situation arises as in the Lebanon crisis, they travel to any part of the world in a matter of hours to perform operations and maintenance at critical support facilities. Team size is not standard and depends on the need for various skills. USAFE can deploy one man or the entire team (21:7).

The organization of USAFE Mobile Teams followed these guidelines:

1. Team composition would be limited in size. (Airmen comprising the team would have to come from available USAFE personnel resources.)

2. The team would be composed of detachable cells capable of providing limited emergency operations and maintenance services at forward operating bases.

3. The entire team would function only in support of essential operations and maintenance.

4. The team would not have a construction capability. (The Army would provide needed construction services.)

5. The team would have to be highly mobile and fast reacting.

6. Finally, the team would normally augment a Civil Engineer force in being. In the event of withdrawal of a civilian work force, the team would require a capability to provide the most essential utilities and facilities operations

> until augmented by a military personnel buildup (21:7).

USAFE's Civil Engineer Mobile Teams were forerunners of AFCE's Prime BEEF teams (3:38) and were soon tested in the contingency described next.

The second contingency occurred in Berlin in 1961 (26:2). Tension had increased in Berlin from the time of the construction of the Berlin wall (4:850) until 25 July 1961 when President Kennedy called for a buildup of all U.S. services in Europe (26:2). As a natural consequence of more people, more facilities would be required to support them (26:2). Brigadier General Oran O. Price, Deputy Chief of Staff of USAFE during this period, said that

> Because of the radical upward changes in mission support requirements the bases were critically short of many basic items such as 60-cycle electric power, ammunition storage facilities, alert shelters, maintenance hangars, and shop space (26:3).

Hence, a facility program was started to support the substantial increase in USAFE forces (26:2). In some cases, this meant a 1200 percent increase in facility requirements (26:2). Most of these new facilities were to be constructed by contract (26:2). However, on Labor Day, less than two months following President Kennedy's announcement, USAFE was notified that the first units would be arriving the next day (3:38). Immediate action needed to be taken to ready the facilities for these incoming units (3:38). Concerning these preparations, AFCE had a head start because USAFE's

Civil Engineer Mobile teams had already been deployed to the various bases which were to be activated and had already started working on the facilities (3:38).

During the Berlin situation, the Air Force requested Army support. Under the provisions of DOD Directive 1315.6, the Army was required to provide military troop construction to the Air Force overseas (33:190). Brigadier General Price describes the Army support provided:

> Support by Army Engineer troops was something less than satisfactory. Shortly after this emergency began, only one Army Engineer battalion could be assigned to support the Air Force. This unit, a regular construction battalion, was neither trained nor equipped for airfield work. After assignment of specific tasks, six weeks passed before the battalion had an effective work force operating, and then under a situation in which the Air Force furnished housing, messing, all of the supplies and some of the engineer equipment (26:4-5).

Evidently, he did not consider Army support very reliable.

Although USAFE's Mobile Teams responded quickly to the Berlin crisis, they also were not given very high marks. It is apparent from the guidelines that a contingency of this magnitude was beyond the Mobile Teams' capabilities. They were designed to provide only essential utilities and operations, not to implement large scale facility programs. According to Brigadier General Price, the facility program nevertheless did succeed because of contractor support and favorable conditions:

> Credit must be given to another fact: deployment in this instance [Berlin crisis] was made to some of the best standby bases in the world, where there was good contractual support and an ample

> supply of skilled labor. It is sobering to. . . contemplate what the results would have been in less favorable circumstances (26:7).

According to Colonel Ashdown, the combination of AFCE's experiences in the Lebanon and Berlin crises pointed out a readiness deficiency:

> It was as a direct result of the crises in Lebanon and Berlin that Air Force Civil Engineers began to realize that the engineer force was inadequately postured to fulfill its responsibilities for maintaining combat support and responding to the critical needs during wartime and other contingencies (3:39).

The next contingency was to develop into a long-term conflict - the crisis in South Vietnam. In 1961, following the increasing threat to the government of South Vietnam by guerilla forces, the United States decided to increase support of South Vietnam (20:3).

> In late 1961 guerilla activities had increased to levels that threatened the Republic of South Vietnam (RVN). A decision was made in December 1961 to increase the number of military advisors in South Vietnam and increase the level of training to the RVN military. Associated with the buildup of U.S. military advisors and equipment was the requirement for new construction (20:3).

This decision caused numerous problems for AFCE. The dilemma was that

> [f]ew CE military personnel were in the command [Pacific Air Forces] and their area of responsibility covered 40% of the earth's surface. PACAF [Pacific Air Forces] was not prepared for the contingency and requested support from the CONUS in the form of CE mobile squadrons. The plan was to locate squadrons on major installations and deploy personnel in flight configurations to support requirements wherever needed (24:10).

Of course, there were no mobile AFCE squadrons to respond to this request. Consequently, AFCE could not respond.

Finally, in 1962, the Cuban missile crisis occurred.

> For the first time, the inadequacies of the CE force and its inability to respond to contingencies were visible at home. The personnel required to support the crisis, their skills, supervision, and general capabilities were unknown. Actually, the CE forces were obtained for deployment by aircraft going from base to base picking up available personnel at random (24:11).

This situation did not go unnoticed.

> Shortly after this [the Cuban missile crisis] occurred, General Curtin, Director of Engineering, moved to develop a worldwide civil engineering military contingency capability. The military force would be designed to respond to emergencies, disasters, and limited or general war (24:11).

The seed for the Project Prime BEEF study group had just been planted.

Other Factors

Other factors contributing to the formation of Prime BEEF were AFCE manpower distribution, career progression, and consideration of AFCE families.

AFCE Manpower Distribution. Another problem with the existing organizational structure was the poor distribution of manpower resources (27:6). According to the Project Prime BEEF study group, some bases did not have enough airmen to continue essential operations adequately under emergency conditions; others had more than they required

(27:6). These variations were characteristic within commands as well as between commands (27:6).

The study group identified several other problems in the use of civil engineering manpower. First, ". . . there was no relationship between the skills identified for military authorizations and the skills needed for direct combat support" (23:4). For example, there were military authorizations for tasks not necessary for direct combat support, such as grass mowing, painting, custodial work, and trash collection (27:6). This disparity is not surprising since AFCE previously had not been considered a direct combat support operation.

Career Progression. Career progression had also been a problem (27:6). During the time of the Project Prime BEEF study, skill levels used in airman Air Force Specialty Codes (AFSC) were related to skill proficiency. The skill level proficiency designator was the fourth digit of the five digit AFSC number. There were four skill levels distinguished - the 3, 5, 7, and 9 skill levels. For example, in the missile facilities maintenance career progression ladder, an airman in missile facilities maintenance at the 3-skill-level was considered an "apprentice missile facilities specialist" (23:5). A 5-skill-level missile facilities maintenance airman was considered a "missile facilities specialist" (23:5). A

7-skill-level missile facilities maintenance airman was considered a "missile facilities technician" (23:5). Last, a 9-skill-level missile facilities maintenance airman was considered a "missile facilities superintendent" (23:5).

In AFCE, however, it was not always possible to attain a 7 or 9 skill level. In five AFCE career specialties, for example, the airmen could advance no higher than a 5 level (27:6). In other words, they were in dead-end career fields.

The proposed Prime BEEF reorganization would eliminate these dead-end career fields by providing the opportunity for each airman to reach a 9 skill level, regardless of his/her entry level specialty (23:4). This was accomplished by establishing 21 career ladders which fed into the following ten 9-level "supergrade" slots:
1) missile facilities superintendent, 2) electrical superintendent, 3) electrical power production superintendent, 4) mechanical superintendent, 5) pavements superintendent, 6) structural superintendent, 7) site development superintendent, 8) work control superintendent, 9) sanitation superintendent, and 10) fire protection superintendent (23:4-5). For example, the career ladders for both the pavements maintenance and construction equipment operators fed into the one pavements superintendent "supergrade" slot (23:4-5).

As expected, if higher skill levels were required, so were commensurate higher grade levels. In short, the Prime BEEF organizational structure called for an increase in higher grades and a decrease in lower grades. The Military Airlift Command's (MAC) history provides a snapshot of MAC AFCE manning on 1 July 1965.

TABLE I

MAC AFCE Manning, July 1965 (19:508)

Prime BEEF Airman Grade	CE Unit Manning Document Requirement	Authorization
E-8 and E-9	55	11
E-7	108	38
E-6	142	90
E-5	275	342
E-4	350	314
E-2 and E-3	419	971
TOTALS	1,349	1,766

The drastic changes mandated by Prime BEEF could not be immediately reflected in Civil Engineering's Unit Manning Document (UMD) because some positions required military-to-civilian conversion and vice versa (19:509). In effecting the conversions, civilian reduction-in-force actions were not authorized (19:510). Therefore, some positions could not be converted until they became vacant by attrition (19:510).

Across the Air Force, the increases in AFCE grades E-6 through E-9 from 1965 to 1970 are shown in Table II.

TABLE II

AFCE Grades E-6 through E-9, 1965-1970 (8:15)

Grade	1965	1970
E-6	2,163	3,118
E-7	913	1,493
E-8	307	586
E-9	70	164
TOTALS	3,453	5,361

These gains were attributed directly to the implementation of Prime BEEF (8:15).

Besides providing additional skill levels and grades, the Prime BEEF structure could improve promotion possibilities by providing competent AFCE airmen with with an opportunity to display their talents in more visible and responsible positions (6:3). Of course, the increased responsibilities would also identify those unfit for promotion. Note the following comments:

> The grade structure called for in the program [Prime BEEF] recognizes the necessity for having experienced and qualified military supervisors and technicians at all levels of responsibility. In a sense, we are demanding more from our civil engineering enlisted force and in return offering them more opportunity to exercise authority, initiative and skills (6:2).

Whether or not this enhanced visibility was a fringe benefit of Prime BEEF depended on the individual airman's competence.

Although the expansion of AFCE career ladders helped solve the career progression problem, it also created a new problem: training. If higher skill levels and grades are

available, training to meet those requirements must also be available. The Project Prime BEEF study group members recognized this problem. Note their comments:

> . . . it was considered basic that a complete and thorough understanding of Civil Engineering training and career development programs and systems was necessary. A complete review of the training centers, OJT [on the job training] programs, skill levels, and career ladders was required . . . . In addition, there was a need to consider special training requirements for the Mobile Combat Support Teams which could be operating in all areas of the world under all conditions (27:19).

This review was completed and necessary changes to the AFCE training programs were implemented.

AFCE Family Consideration. Finally, Prime BEEF was designed to prepare AFCE members for short notice TDYs (8:15). Prior to Prime BEEF, as mentioned earlier, a short notice AFCE contingency was answered by individuals selected at random from various bases with no prior warning (27:6). Both they and their families were unprepared for this disruption to their lives. Under Prime BEEF, the AFCE member would be "familiar with and prepared for emergency response" (8:15) because he/she would be part of a structured mobility team.

Summary of the Rationale Behind the Organizational Structure

The increase in weapons systems facility dependence, the increase of contingencies worldwide, and the inability of the then current AFCE structure to respond quickly and adequately to contingencies, all led to Prime BEEF.

Consequently, the Project Prime BEEF study group reorganized AFCE to ensure quick, effective response to contingencies.

The rationale behind implementing Prime BEEF is best summarized by Major General Curtin:

> It [Prime BEEF] is an Air Force-wide program to assure that our total Civil Engineering force is in proper balance and can provide responsive support to all short-term emergencies as well as meet our normal day-to-day needs (7:1).

III. Initial Prime BEEF Organizational Structure

Prime BEEF was initially set up with two types of teams to carry out two functions: (1) Base Engineering Emergency Teams (BEET) and (2) Mobile Combat Support Teams (MCST) (27:11). Both teams were organized to provide AFCE base recovery support for emergencies or contingencies. The BEET teams were designed to provide the at-home base recovery; the MCST teams were designed to deploy in support of deployed flying units. Five operational teams were then formed to cover these functions: the Recovery Team (BEEF-R), the Contingency Team (BEEF-C), the Flyaway Team (BEEF-F), the Missile Team (BEEF-M), and the Logistics and Support Team (BEEF-LS) (9). Since the BEEF-R team was the only team postured under the Base Engineering Emergency Team concept, it was the only stay-at-home team; all of the other teams were structured for mobility.

The Recovery Team (BEEF-R)

The BEEF-R team was to provide the minimum military AFCE work force to maintain essential operations and base maintenance services during and after such contingencies as an enemy attack or a natural disaster (23:2). These essential services were limited to

a. Work Control
b. Structural and Crash Fire Protection
c. Water Supply and Distribution
d. Sewage Collection and Disposal
e. Heat Production and Distribution Including Gas

f. Liquid Fuel Systems
g. Electric Power, Production and Distribution
h. Refrigeration and Distribution of Coolants for Other Than Comfort Cooling
i. Debris Removal, Snow Removal, and Pavement and Railroad Repair
j. Structural Damage Control (27:12)

Every Air Force base had its own BEEF-R team from the AFCE personnel assigned to that base to provide organic recovery (23:2). Each BEEF-R team was organized so that it could maintain base-essential functions for 36 hours using two shifts (23:2). Naturally, the physical size of the air bases influenced the size of the BEEF-R team (9). In the Project Prime BEEF report, the following standard manning guide was formulated (27:16):

TABLE III

Prime BEEF Standard Manning Guide (27:16)

		Officers	Airmen	Total
A.	BEET (L) [BEEF-R]	6	160	166
B.	BEET (S) [BEEF-R]	6	97	103
C.	BEET (ST) [BEEF-R]	1	32	33
D.	MCST (F) [BEEF-F]	1	59	60
E.	MCST (M) [BEEF-M]	*	*	*
F.	MCST (C) [BEEF-C]	1	59	60

* No change from current base authorizations.

(L) Large base
(S) Small base
(ST) Site or station

Thus the BEEF-R team varied in size depending on the base size: large, small, or a site/station.

In Prime BEEF Base Recovery Forces (24) (May 1973), Major Hubert S. Nethercot conducted a "thorough evaluation of the R-team SMG [standard manning guide]" (24:5). His comments clarify the "large" or "small" base:

> If a base had an authorized strength of over 3,000, the large R-team SMG would apply. If the population were less than 3,000, the small team SMG would apply (24:26).

He did not cover guidelines for defining an Air Force installation as a site/station; if the terms "site" or "station" appear in the installation's title, the site/station BEEF-R manning no doubt applied.

The Contingency Team (BEEF-C)

The BEEF-C teams were set up to support contingencies and other air warfare operations. They were not attached to any specific flying unit (23:3). These 60-man teams also could be ordered to assist BEEF-R or BEEF-F teams. Although every base had a BEEF-R team, only designated bases had BEEF-C teams (23:3). There were 46 BEEF-C teams (23:3). Six bases had two BEEF-C teams (9:6).

The Flyaway Team (BEEF-F)

BEEF-F teams provided engineering support to deployable flying units (23:3). Like the BEEF-C team, a BEEF-F team had 60 people and could be tasked to assist the other Prime BEEF teams (23:3). The mix of skill types for the BEEF-C

and BEEF-F teams were identical to provide interchangeability (27:16). The 24 BEEF-F teams supported specific flying units; each BEEF-F team deployed with its assigned unit whenever and wherever it deployed (9:2). There were 24 BEEF-F teams assigned (10:8).

The Missile Team (BEEF-M)

The Missile Team, BEEF-M, was set up to

> . . . provide depot level maintenance for real property installed equipment and facility maintenance beyond the missile maintenance organization's capability. There is no set manning guide for the BEEF-M teams, therefore, manning will coincide with current civil engineering authorizations required to support the missile facilities. If the missiles are launched, these teams will be available for deployment unless the sites are to be rearmed (11:5).

As with the BEEF-F teams, the BEEF-M teams were identified with specific units (27:15). At a missile base, both BEEF-R and BEEF-M teams would be used. The BEEF-R team was responsible for the base's essential services, and the BEEF-M team was responsible for specialized missile maintenance facilities and equipment.

The Logistic and Support Team (BEEF-LS)

BEEF-LS teams were special contingency teams assigned to the Air Force Logistics Command (AFLC) (11:5). There were six of these 77-man teams which were "similar in most respects to BEEF-C teams except for the larger size" (11:5,13). Also, they were not attached to specific flying

units (11:5). The mission of the BEEF-LS teams is unclear. Perhaps, it is best to view the BEEF-LS teams as large BEEF-C teams assigned to AFLC bases.

The Engineering Assistance Team (BEEF-E)

In 1971, the Prime BEEF Engineering Assistance Team (BEEF-E) was added to

> . . . provide engineering design, site selection, construction management, construction inspection, and special engineering studies in support of MAJCOM requirements or contingency operations, disasters, and other emergencies. They may support peak design or construction loads and other engineering tasks such as base development plans, master plan studies, and drainage studies when required by MAJCOM (11:5).

BEEF-E teams had 38 people and were organized by command, not by base (11:5). BEEF-E team members could not be on any mobile teams, but they could be members of a BEEF-R team (11:5). Each command had at least one full or half team (11:15). There were twelve full teams and six half teams (11:15).

Prime BEEF Team Summary

Major Nethercot summarized the approximate number of Prime BEEF teams and their personnel:

TABLE IV

Prime BEEF Team Summary (24:33)

Type of Team	Number of Teams	Average Team Size by Personnel	Total Personnel
Base R-Teams			
Postured (L&S)	117	161	18,868
Sites, Stns	-	-	5,784
C-Teams	46	60	2,760
F-Teams	22**	60	1,320
M-Teams	10	97	974
LS-Teams	1***	77	77
E-Teams	15	40	600*
TOTALS	211		29,783

* Personnel on E teams were selected primarily from existing BEEF-R resources (57:33).

** According to AFR 93-3, 15 Mar 71, there were 24 BEEF-F teams.

*** According to AFR 93-3, 15 Mar 71, there were 7 BEEF-LS teams.

If we take into account the corrections identified in the notes to Table IV, these figures total 219 teams with about 30,365 people. Of these 30,365, only 5,703 people were on MCST teams. In other words, approximately 19% of AFCE Prime BEEF personnel had a mobility mission.

Prime BEEF Deployment Authority

Initially, the Directorate of Civil Engineering (AFOCE) was the HQ USAF office of primary responsibility (OPR) for Prime BEEF (10:4). This responsibility was shifted to the Civil Engineering Center in 1971 (11:7). The Civil Engineering Center, however, was the primary deployment authority from the beginning. The deployment authority from Air Force Regulation 93-3, 15 Mar 71, is provided in Appendix A.

IV. Prime BEEF in Action

Introduction

How well did this organizational structure work? Were the considerations developed and used by the Prime BEEF study group valid? Could this new Prime BEEF organizational structure function in a contingency environment? The experiences of Prime BEEF examined in this section will help answer these questions.

Prime BEEF in Santo Domingo

In May 1965, before Prime BEEF even reached its first birthday, men assigned to it were called into action in Santo Domingo, capital of the Dominican Republic, at San Isidro Air Base in May 1965 (25:16). The situation there ". . . exploded in a popularly based and democratic social revolution. Fearing a second Cuba, however, the United States again occupied the country militarily and snuffed out the revolution" (12:949). In support of this effort, the first Prime BEEF "team" was deployed consisting of nine men, one officer, and eight non-commissioned officers (NCOs) of varying technical expertise:

TABLE V

Santo Domingo Prime BEEF Team Composition (25:16)

Job Title	AFSC	Total Personnel
- Maintenance Engineer	5544	1
- Electrician	54250	2
- Electrical Power Line Specialist	54251	1
- Construction Equipment Operator	55151	1
- Carpentry Specialist	55250	2
- Plumbing Specialist	55255	1
- Water/Waste Processing Specialist	56370	1
	TOTAL	9

This team was tasked "to provide support for the Airlift Fleet which was moving U.S. Army forces into the area" (25:16). Captains Waggoner and Moe describe the problems encountered as this Prime BEEF team tried to work specific localized problems with a general mobility kit.

> Its mission was to support U.S. operations using a "Gray Eagle" mobility kit. "Gray Eagle kit" was the name given to a rapid deployment kit (developed by Tactical Air Command (TAC)) which encompasses all of the necessary support items for 1100 men. The kit included tents, mess equipment, housekeeping supplies, vehicles, lighting kits, and runway arresting barriers. The purpose of the kit was to allow rapid deployment to an expeditionary airfield, remain operational for a limited period of time, and then withdraw taking whatever could be salvaged for reuse.
>
> This initial deployment was fraught with the same type of problems that would recur during subsequent deployments to SEA [Southeast Asia]. The rapid deployment of forces precluded any careful camp layout, causing tents and other structures to have to be relocated several times. There was a language barrier which made it difficult to obtain cooperation or support from the local

> nationals. Although Gray Eagle Kits were established based on obtaining consumable supplies and materials locally, there were no such supplies available in the Dominican Republic. Finally, there were no spare parts included in the Gray Eagle Kits for equipment or vehicle repair (33:219-220).

Besides this first use of Prime BEEF, there are other noteworthy facts about the Prime BEEF deployment to Santo Domingo. This was not the deployment of a Prime BEEF team but the deployment of just nine Prime BEEF personnel. In this situation, the use of an entire BEEF-C team would have been inappropriate because the task did not require 60 men. This fragmentary use of BEEF teams would become the standard practice of the Prime BEEF program.

It is unclear from the published literature why Prime BEEF teams were not reduced in size given this frequent use of fragmentary teams. One explanation may be that in a major conflict, such as World War II, these teams sizes would be appropriate for supporting flying units in an intercontinental conflict. Facility damage repairs in a full-fledged war would require the skill diversity and size of a 60-man Prime BEEF team. In most instances, probably more than one team would be needed. Again, one could also argue that it is easier to scale down forces for specialized requirements than to combine a multitude of small sized forces when faced with a major conflict.

First Prime BEEF Deployment in Vietnam

In August 1965, shortly after the Santo Domingo deployment, three Prime BEEF teams were sent to Vietnam. Colonel Henry J. Stehling describes the critical aircraft parking/protection problems which led to their deployment:

> The lack of AF Civil Engineer resources in-country at the time of the Tonkin Gulf incident and the urgent requirement to provide immediate facilities for the rapid buildup of tactical units in SEA [Southeast Asia], provided the necessity and challenge for proving the Prime BEEF concept.
>
> Pavement for aircraft parking was at a premium. . . . The resulting crowded aircraft parking situation which compromised safety clearance distances . . . became a matter of grave concern. This condition generated an urgent need for the erection of protective aircraft revetments in addition to expansion of parking pavement.
>
> . . . Although the Prime BEEF concept was only in the initial stages of implementation at that time, Prime BEEF assistance was immediately requested for revetment erection to coincide with the first ARMCO kit deliveries for August 1965.
>
> Three 25-man Prime BEEF revetment erection teams [actually one 25-man team and two 23-man teams (43:2,119)] were initially deployed to Tan Son Nhut, Bien Hoa and Da Nang in August 1965. Although a very modest initial utilization of Prime BEEF, the performance of these teams augmented by 20 or 30 local nationals for each team, fully demonstrated the value of the concept (28:4-5).

These three Prime BEEF teams demonstrated their value by constructing over 12,000 linear feet of revetments. Undoubtedly, this was the most important test to date for Prime BEEF, but it was not the first Prime BEEF deployment as has been often thought.

As in Santo Domingo, fragmentary teams were used in this early deployment to Vietnam. Furthermore, the three teams were referred to as Major Command (MAJCOM) teams: 1) a 27-man Air Defense Command (ADC) team 2) a 23-man Air Training Command (ATC) team, and 3) a 23-man Strategic Air Command (SAC) team (31:2). The ADC and ATC teams were composite intracommand teams; that is, the teams were composed of Prime BEEF members from more than one base within the same MAJCOM (32:3). The SAC team was composed of Prime BEEF members from Biggs Air Force Base, Texas (32:3). The accomplishments of these three Prime BEEF teams were impressive and are shown in Table VI.

TABLE VI

Prime BEEF Accomplishments in Vietnam (First three teams) (31:121-122)

(a) ADC Team

Purpose of Deployment	Principal Accomplishments
Armco Aircraft Revetments at Tan Son Nhut Air Base	4,700 linear feet of revetments 12 feet high, 5 1/2 feet wide.
	11,800 cubic yards fill in revetments.
	36,784 square feet of steel blast deflector in revetments.
	130,000 square feet of pierced steel planking removed.
	155,000 M9M1 square feet of M9M1 matting installed.
	4 acres of grubbing, clearing, and grading for dormitory construction.
	9,200 square feet of concrete slabs.
	1 - 20-foot by 100-foot 2-story dormitory.

TABLE VI continued

(b) ATC Team

Purpose of Deployment	Principal Accomplishments
Armco Aircraft Revetments at Bien Hoa Air Base	3,800 linear feet of revetments 12 feet high, 5 1/2 feet wide.
	9,500 cubic yards fill in revetments.
	30,096 square feet of steel blast deflector in revetments.
	2,666 square yards of concrete shoulders.
	1,400 linear feet of drainage ditches adjacent to aircraft parking apron.
	1 - POL (petroleum, oils. and lubricants) bladder revetment.

TABLE VI concluded

(c) SAC Team

Purpose of Deployment	Principal Accomplishments
Armco Aircraft Revetments at Da Nang Air Base	3,540 linear feet of revetments 12 feet high, 5 1/2 feet wide.
	9,850 cubic yards fill in revetments.
	1,500 linear feet of shoulder stabilization.
	3,333 square yards of concrete ramp for bomb storage.
	1,222 square yards of pierced steel planking for O-1E aircraft.
	8,888 square yards of pierced steel planking for hardstands
	1,200 square foot warehouse, wood frame.
	7,250 square feet of concrete and pierced steel planking for trailers.

The Headquarters Seventh Air Force Historical Division summarized the accomplishments of these three Prime BEEF teams:

> During their four-month tour, the three pilot Beef [sic] teams between them accounted for 12,040 linear feet, or nearly 45 percent, of the 27,000 LF [linear feet] of revetments erected on RVN [Republic of Vietnam] bases since the summer of 1965. In dollars and cents, their combined efforts totaled $1,164,000 [complete project cost] (31:5,119).

The other Prime BEEF teams which followed also produced some impressive results. A summary of Prime BEEF accomplishments from August 1965 to February 1967 including the work of the first three teams is shown below:

TABLE VII

Prime BEEF Accomplishments, August 1965-February 1967 (5:5,31:120)

- Revetments - 27,000 linear feet
- Fill-used in Revetments - over 53,000 cubic yards
- Blast Deflectors - 9,300 square yards
- 190 wood/metal,1 story buildings - over 290,000 square feet
- 50 wood buildings, 2 story - over 220,000 square feet
- Concrete ramps - 3,700 square yards
- Concrete shoulders - 2,700 square yards
- PSP removal - 14,500 square yards
- Matting placed - 55,600 square yards
- Grubbing and grading - 8.5 acres
- Drainage ditches - 1,400 linear feet
- Sanitary sewers - 1,800 linear feet
- Water mains - 19,100 linear feet
- Tent frames - 44,000 square feet
- High Intensity Lighting system
- Runway lighting cables - 1,200 linear feet
- Electric service drops - 45 buildings
- Electric distribution system - 16,000 square feet
- Modular Hospital (100 bed) - 16,000 square feet
- Water wells, field latrines, septic tanks, etc.

A more detailed breakdown of these accomplishments can be found in Appendices C and D.

Deviation from Prime BEEF Guidelines

Although the initial use of Prime BEEF in Vietnam has often been regarded as the baptism by fire of the Prime BEEF program, it really was not. The use of Prime BEEF in

Vietnam actually deviated from the original Project Prime BEEF design (31:3). The five-team concept was disregarded in Vietnam in favor of specialized hybrid teams comprising various skills and commands (31:3). As early as 1967, the Headquarters of the Seventh Air Force documented the difference between the use of Prime BEEF and the original program:

> While "Flyaway" and "Contingency" teams have been designated at continental U.S. (CONUS) bases and could, by reason of their very purpose, be eligible for SEA [Southeast Asia] deployment, they have not been called upon to serve. The fact that none of them has been utilized in this theater, coupled with the constitution of teams across major command lines, signifies the difference between SEA PRIME BEEF employment and the basic program (31:3).

The Military Airlift Command's Prime BEEF deployment record during this period illustrates these hybrid teams. From 15 September 1965 through 6 October 1966, MAC deployed the composite teams itemized in Table VIII. "MAC did not deploy a complete BEEF-C or F team from a single base (unilaterally) during this period" (19:514).

TABLE VIII

MAC Prime BEEF Deployments, September 1965-October 1966 (19:514)

*Deployment #:	2	3	6	14	30
Date:	15 Sep 65	17 Oct 65	5 Jan 66	16 Apr 66	6 Oct 66
Personnel From:					
Dover AFB	1 Capt** 4 Amn	5 Amn**	4 Amn	4 Amn	
Charleston AFB	5 Amn	5 Amn	6 Amn	4 Amn	4 Amn
McQuire AFB	4 Amn	1 Lt** 7 Amn	7 Amn	5 Amn	3 Amn
Travis AFB	4 Amn	10 Amn	6 Amn	3 Amn	9 Amn
Hunter AFB		1 Capt 3 Amn		1 Capt 9 Amn	4 Amn
Scott AFB			1 Capt 4 Amn	4 Amn	4 Amn
Orlando AFB			1 Amn		2 Amn
Kindley AFB					1 Capt
Norton AFB					1 Amn
Officers	1	2	1	1	1
Enlisted	17	30	28	29	27
TOTAL	(18)	(32)	(29)	(30)	(28)

* At the end of TDY (temporary duty) team members were to be returned to home stations. The deployment numbers were assigned by Hq USAF.

** Capt (Captain), Amn (Airman), Lt (Lieutenant).

Prime BEEF Team #6 was one of these small hybrid teams. Its skill mix, shown in the table below, illustrates how the teams were tailored for specific tasks.

TABLE IX

Prime BEEF Team #6 Composition (14:1)

Job Title	AFSC	Total Personnel
- Construction Engineer	5534	1
- Metal Processing	532X0	2
- Electrical Power Production	543X0	1
- Pavement Maintenance	551X0	11
- Construction Equipment Operator	551X1	6
- Carpentry	552X0	1
- Site Development	553X0	1
- General Maintenance	555X0	4
- Motor Vehicle Maintenance	471X0	2
	TOTAL	29

The specific task of Prime BEEF Team #6 was to construct aircraft revetments at Tan Son Nhut Air Base and at Bien Hoa Air Base (31:124). Since Prime BEEF Team #6 was tailored to meet this requirement, the majority of its members were either pavement maintenance airmen or construction equipment operators, the primary skills needed for revetment construction. During their four-month deployment, they erected 6,140 linear feet of Armco steel revetments which were 12 feet high and 5 1/2 feet wide (31:124).

Detailed data on the other major commands, besides that provided in Appendices C and D, is sparse. Scattered

specific information on the use of hybrid teams, however, tells us, that Tactical Air Command (TAC) deployed two Prime BEEF teams to do general construction, Prime BEEF Teams #10 and #22. Prime BEEF #10 consisted of 30 men from 14 TAC bases (17:1,18:1). This team included eleven different AFSCs, but the specific AFSCs were not listed (17:1). Prime BEEF Team #22 consisted of 50 men from 17 TAC bases (18:1). This team included carpenters, plumbers, electricians, masons, equipment operators, roads and grounds specialists, and a site developer (18:1). Again, the number of personnel from each skill area was not listed. The wide variety of skills on both teams were required for general construction work.

Another instance of a small, highly specialized team, drawn from Air Defense Command, was Prime BEEF Team #8 which consisted of 12 plumbers (15:1). Their task was to construct sanitary latrines and to extend the water/waste systems at Tan Son Nhut (15:1). A very specialized team for very specialized requirements.

The reasoning behind the Prime BEEF program deviation appears to be derived from the specialized situational requirements of Southeast Asia. According to one Prime BEEF chief in South Vietnam, "No one CONUS team could have mustered the crafts necessary to local construction requirements" (31:4). An entire BEEF-C team might have too few right skills available and too many unnecessary skills.

For example, Prime BEEF #2 had to build a potable water system and a sewage system for a major portion of Tan Son Nhut Air Base (30:4), a job much too large on the one hand for the plumbing shop on any one base. On the other hand, a complete BEEF-C team with 60 people, would have had five plumbers only and 55 other men with skills that were unnecessary for that project (24:61).

Problems Experienced by Prime BEEF in Vietnam

Prime BEEF experienced numerous difficulties in Vietnam; however, only a few of them were connected directly or indirectly to the organizational structure of Prime BEEF used in Vietnam.

Transportation. The first and most often cited problem in most end-of-tour Prime BEEF reports dealt with transportation from the United States to Vietnam. The reports emphasized that teams should have been deployed as units not as individuals (14,16,17). Prime BEEF Team #6 argues that traveling together improved unit cohesion:

> Prime BEEF Team #6 (MAC)
>
> Recommendation: That all team members arrive on the same aircraft. Our team was fortunate in this respect, but personal observation of other teams arriving over a period of weeks showed they missed the opportunity to get acquainted with fellow workers on the way over and it took a longer time to mold themselves into a smooth operating unit (14:3).

Prime BEEF Teams #9 and #10 pointed out that much wasted time and frustration could have been avoided if all team members arrived on the same aircraft:

Prime BEEF Team #9 (3 Commands)

> All team members should arrive on the same aircraft. This problem has been stated many times. At Tan Son Nhut, many valuable man-hours were spent picking up incoming team personnel. As previously mentioned, transportation was a problem and getting a vehicle to pick these troops up was, to say the least not easy. If they all arrived at the same time, a bus could be dispatched to transport them to their quarters at one time and save valuable man-hours (16:2).

Prime BEEF Team #10 (TAC)

> The first problem encountered in the area of personnel management was the lengthy staggered arrival of the Team members (17:3).
>
> Recommendation: That all Team members arrive on the same aircraft (17:4).

If the original Prime BEEF program had been followed, the Prime BEEF members would have deployed as entire BEEF-C or BEEF-F units. However, given the use of hybrid teams, all of the Prime BEEF team members should probably been transported to one staging point on the West Coast of the U.S. and then on to Vietnam together. This method would have increased unit cohesiveness as well as minimized transportation problems once they arrived in Vietnam.

Local Transportation and Equipment. Once the Prime BEEF teams arrived at their deployment destination, they faced numerous work related transportation problems of a different kind: the lack of vehicles and construction

equipment (15,16,17,18). Prime BEEF Team #6 considered the competition for heavy equipment its biggest problem.

Prime BEEF Team #6 (MAC)

> Equipment: This was by far our major problem. . . . It was a constant battle with the BCE [Base Civil Engineer] and other base agencies to obtain equipment. . . . Only through constant badgering and readjustment of our schedules to avoid conflict with other agencies were we able to obtain adequate equipment to complete the schedule (14:2).

Similarly, Prime BEEF #8 had trouble finding vehicles to use and notes that many labor hours were lost because of it.

Prime BEEF Team #8 (ADC)

> Transportation: As with all other teams, this was a major problem. The first month was spent without a vehicle of any type which made material hauling extremely difficult. Finally, we obtained an [sic] 2 1/2 ton truck and this alleviated the problem to some extent; however, it was still difficult to keep three crews supplied and transported with one vehicle. Many man-hours were lost from lack of transportation (15:2).

From Prime BEEF #10's report below, it appears that vehicular levies were placed on the base civil engineering squadrons to support Prime BEEF vehicle requirements. This, of course, created a competitive rather than a cooperative relationship for these scarce vehicles.

Prime BEEF Team #10 (TAC)

> Equipment Problems: Vehicles and heavy construction equipment were virtually non-existent. At one point, the requirement for a front-end loader became so critical that the team was forced to request direct assistance from the Hq 7th AF Directorate of Civil Engineering (DCE) (17:4).
>
> Recommendations: That Teams not be requested or sent to bases until an approved construction

program and all necessary materials and equipment are on hand in a designated holding area.

That a vehicular levy be placed against the base to which a Prime BEEF Team is deployed instead of the Civil Engineering Squadron of that base (17:9-10).

In Prime BEEF #22's report, the lack of equipment and the competition between Prime BEEF and the Base Civil Engineering for that equipment is apparent. In this particular instance, a contractor came to the rescue.

Prime BEEF Team #22 (TAC)

Equipment: Certain specialized equipment was always in short supply or not available. At Bien Hoa we had only one 3/4 yard concrete mixer and at times were unable to progress as fast as we would have liked because of a lack of finished slabs to do erection. At one time, when the Base Civil Engineers concrete mixer broke down, they pulled ours to pour concrete. Finally after many hours of discussion, we were able to obtain a 3/4 yard mixer from RMK [Raymond, Morrison, and Knudsen, a United States construction firm], which we used until we rotated (18:2).

We were assigned one Payloader by the Civil Engineers, but there were several instances where we had it pulled back because they had higher priority work. This necessitated the curtailment of concrete work or fill movement of these occasions (18:2).

Although the Prime BEEF teams were sent to Vietnam to aid the Base Civil Engineer (BCE) organizations, the shortage of vehicles/equipment sometimes made adversaries of the BCE Squadrons and the Prime BEEF teams because they had to share equipment. There simply were not enough vehicles to serve everyone's needs. There is no indication that the

transportation/equipment shortage was solved during the Vietnam conflict.

Even if Prime BEEF had been implemented as intended, the shortage of vehicles and equipment still would have existed. In fact, it would have been worse because the larger BEEF-C/F units would have required more transportation and equipment support. The logistics to support any type of TDY civil engineering forces were grossly inadequate.

Construction Materials. Another major problem was the quality and availability of materials. Prime BEEF Team #8's report indicates that improvisation was the order of the day:

> Prime BEEF Team #8 (ADC)
>
> Materials: In this area, we went from one extreme to the other. We had a large supply of pipe (all sizes) and fixtures, but lacked fittings with which to make connections. Many fittings were constructed by the team out of odd sized materials (15:1).

In the case of Prime BEEF Team #9, the skills of the exterior lineman were wasted because the proper primary line material was not available:

> Prime BEEF Team #9 (3 Commands)
>
> Materials: This was a constant headache for all TDY units in Vietnam. In the case of the exterior lineman, lack of materials completely negated the purpose for which they were deployed. Primary distribution lines which were to be extended and interconnected to provide a better integrated system was never accomplished for upon arrival the team found no primary line material on hand. Materials had been ordered but had not arrived.

This lack of material necessitated use of exterior lineman to wire dormitories (16:2).

Prime BEEF Team #10's materials problem got so bad that the Team leader had to make a special trip to the Philippines to get the required materials:

Prime BEEF Team #10 (TAC)

Materials Problems: There was a constant shortage of materials encountered. In many cases, the Team was informed that material had been ordered, but the Base was unable to produce 1445's [supply requisition documents] or other evidence that the same had been ordered. This became so critical that the Team leader made a personal trip to the Phillipines [sic] to obtain material for the completion of the Dental Clinic (17:6).

The two basic materials consistently out of supply were lumber and concrete aggregate. This was the reason that several buildings were left unfinished (17:6).

Finally, Prime BEEF Team #22 deserved an award for imagination, improvisation, and negotiation. They thought of alternative ways to complete projects with unusual materials from unusual sources such as the Munitions Squadron:

Prime BEEF Team #22 (TAC)

Materials: Materials were one of our biggest problems.

On 1 July 1966 through 5 July 1966, we stopped concrete work because of lack of aggregate. Two weeks later we stopped for a few days because of a lack of cement.

On the Canine Kennel Project, we started construction without all materials available because of the immediate need for the structure. Seven foot cyclone fence, posts, and all hardware were on order, but not available during

> construction. Two inch galvanized pipe and one and one half inch rigid conduit were substituted for fence posts. One inch pipe was welded for top and bottom rails in lieu of proper materials. Stocked eight foot fence was cut and used in place of the seven foot fence. No bailing [sic] wire was available for wiring our concrete wall forms so 3/4 inch wire cable was cut and the wire strands used to wire the forms.
>
> Because of a lack of proper building insulation we were contemplating holding up on the Data Systems Singapore building, which in turn would slip the date that the UNIVAC 1050 could be delivered to the base. Because of the importance of this project, we looked for some suitable substitute and came to the conclusion the the "stirofoam" containers in which the aerial flares were delivered to the munitions area were ideal. This substance did not support combustion and was an excellent insulator. Through the cooperation of the Munitions Squadron at Bien Hoa, we were able to obtain enough of these cartons to completely insulate and soundproof the walls of this 20' X 60' building. This material was also used to insulate the EOD building which was of wood construction (18:4)

In other words, scrounging and innovation were daily requirements of the Vietnam Prime BEEF teams. There is no indication that the material shortage problem was solved during the Vietnam conflict. Colonel Archie S. Mayes, then of the Directorate of Civil Engineering for the Seventh Air Force, described the Vietnam logistics system in a 1967 end-of-tour report as

> . . . purely a push system which sent in tons of material, much of which could not be used but had to be handled by an already undermanned supply force. The manning of the supply function was based on CONUS standards where many items of supply are bought on the open market and do not need to be stocked or handled. In addition there are generators, water supply materials, runway matting, revetment material and a multitude of

> other items not required in CONUS which must be received, stocked, and accounted for here (1:36).

Other Problems. Prime BEEF members also had to work with a shortage of field gear and weapons (17:5), pay arriving late (15:2,17:6), and a shortage of administrative personnel (14:4). To rectify the field gear and weapon shortage, one end-of-tour report recommended that these items be issued to individual Prime BEEF team members at their home station (17:10). To correct the pay problem, one end-of-tour report recommended that members have their pay sent to CONUS banks and live on personal checks (an early version of today's sure-pay system) (15:2). Last, it was proposed by one Prime BEEF team that

> . . . each Prime BEEF team contain one 702X0 (5 or 7 level) [administration skill type AFSC] to handle all the weekly reports and historical reports since bases [in Vietnam] do not have enough administrative personnel to handle their own workload (14:4).

If the Prime BEEF program had been implemented as planned, the pay problems would have been less prevalent. Individual AFCE members sporadically going to Vietnam as part of hybrid Prime BEEF teams probably made accounting for them difficult. Consequently, pay checks were mailed to the wrong place. The field gear and weapons shortage and administrative personnel shortages, however, would still have been problems since there were no plans for them in the original Prime BEEF program.

Prime BEEF's Report Card in Vietnam

In spite of all the problems Prime BEEF experienced in Vietnam, the consensus was that Prime BEEF met or exceeded its purpose. This success is especially significant because facility maintenance in Vietnam was inherently difficult. The Joint Logistics Review Board (JLRB) extensively studied base facilities maintenance in Vietnam. The objectives of their study are stated below:

> The objectives of this monograph [the JLRB study] are to review the overall facilities maintenance and related services effort from the viewpoint of responding to the requirements of the RVN [Republic of Vietnam] contingency and to determine how facilities maintenance and related services requirements can best be provided for in future contingencies (1:4).

The JLRB examined the facility maintenance functions of the Army, Navy, Air Force, and Marine Corps including ". . . the maintenance and alteration of constructed and leased facilities, the accomplishment of minor new construction projects, the operation of utility systems, and related services" (1:4).

Along with their study objectives, the JLRB emphasized the unique facility maintenance situation in Vietnam.

> The extensive nature of the facilities maintenance that would be required in Vietnam was not foreseen in advance. This extensiveness resulted from a combination of factors: the country-wide combat operations, the use of main bases or enclaves from which operations radiated, guerilla activities, the length of the conflict and the amount of more permanent construction, and the undeveloped nature of the country. Thus the requirements for facilities maintenance support greatly exceeded that encountered in previous wars (1:3)

The findings of the JLRB study attest to the success of Prime BEEF. In concluding a chapter entitled "Organization and Buildup of [facility maintenance] Capabilities," the JLRB recommended that

> . . . the Services provide a sufficient number of military personnel trained in facilities maintenance functions in their active duty structure to provide an adequate nucleus to support contingency operations. The Air Force Prime BEEF concept is one method of accomplishment (1:41).

Looking at the Air Force in particular, the JLRB praises Civil Engineering for its use of enlisted personnel in facility maintenance (45 percent in CONUS), and for the development of a trained, mobile facility maintenance force (Prime BEEF) (1:11). "Thus," they conclude, "the Air Force was in a unique position among the Services by having a force in being that was rapidly deployed to Vietnam to assist in accomplishing the facilities maintenance function" (1:11).

> [The Air Force] mans approximately 45 percent of its CONUS facilities maintenance spaces with enlisted personnel. These personnel are assigned to and actively engaged in facilities maintenance tasks and are ready and trained for response to contingencies on a worldwide basis. They comprise the Air Force Prime BEEF (Base Engineer Emergency Forces) program, which constitutes an in-being solution to the necessity for an expanded, trained, active duty maintenance troop base. Thus the Air Force was in a unique position among the Services by having a force in being that was rapidly deployed to Vietnam to assist in accomplishing the facilities maintenance function (1:11).

The JLRB also commends the Air Force for responding to overseas requirements in a more timely fashion than the other Services because of its more equitable mix of civilian and facilities maintenance forces (1:17). The Prime BEEF program had met the goal of providing a more equitable civilian/military AFCE manpower mix.

> By the close of 1964, the Services depended largely on civilian work forces to perform their worldwide facilities maintenance requirements. Most of these requirements were being performed by direct-hire civilians, with some services (such as custodial and refuse collection) being performed by contract. The trend toward civilianization of these tasks limited the ability of the Services to respond to facilities maintenance requirements with military personnel. The Air Force had a more equitable mix of civilian and military facilities maintenance forces; consequently it was able to respond to overseas requirements in a more timely fashion (1:17).

The JLRB concluded that the Air Force had "considerably fewer problems" in meeting facilities maintenance requirements than the other Services because

> 1. The physical characteristics of an air base are relatively uniform and are not subject to relocation.
>
> 2. The utilization of Air Force civil engineering personnel (military) in base civil engineering units on a TDY basis and the use of the Prime BEEF teams and the RED HORSE Squadrons.
>
> 3. The dependence of the Air Force on a high standard of facilities maintenance to accomplish its mission (1:65-66).

Here again, the JLRB emphasized the Air Force's use of Prime BEEF teams in meeting facility maintenance requirements in Vietnam.

The success of the Prime BEEF program in meeting Vietnam facility maintenance requirements argues well for the unit, but the most important line on Prime BEEF's report card asks the question, "How well did Prime BEEF support mission accomplishment?" In November 1967, General J. P. McConnell, then United States Air Force Chief of Staff, gave his evaluation: "indispensable."

> In the current zone of conflict many of the wing commanders in South Vietnam and Thailand assured me that the engineering services supplied by this program [Prime BEEF] were indispensable to the success of their mission (22:409).

Confirming General McConnell's judgment, the JLRB stated that "the performance of facilities maintenance was not a limiting factor in combat operations during the Vietnam conflict" (1:68). Both General McConnell and the JLRB gave Prime BEEF high marks for contribution to mission accomplishment.

Finally, another question still remains. Was it the Prime BEEF organizational structure or the men themselves who were responsible for the numerous accomplishments of the Prime BEEF teams in Vietnam? Actually, the answer lies somewhere in between because both contributed to Prime BEEF's success in Vietnam. Although the organizational structure was largely abandoned, it had prepared the AFCE organization to be ". . . ready and trained for response to contingencies on a worldwide basis" (1:11). In addition,

the original Prime BEEF program provided AFCE with a more equitable civilian/military manpower mix and ". . . consequently it was able to respond to overseas requirements in a more timely fashion" (1:17). Without these preliminary preparations, AFCE facility maintenance efforts in Vietnam would not have been nearly as successful; AFCE would have been ill-prepared with a unbalanced civilian/military manpower mix.

The hard work, ingenuity, and dedication of the men assigned to the Vietnam Prime BEEF teams was at least equal in importance to the organizational structure in achieving Prime BEEF's success in Vietnam. Considering the handicaps the Prime BEEF teams had to work with in Vietnam, their accomplishments are remarkable. The Prime BEEF teams were determined to make the best of a poor situation. Their esprit de corps is apparent in this excerpt from Prime BEEF Team #10's report:

> The primary problem encountered by the Team was one of logistics which included, but was not limited to, men, materials and equipment. In spite of these problems, the majority of projects were accomplished without appreciable delay. This was primarily a result of rescheduling work on the projects many times. Even with the rescheduling of work, the Team would not have been able to accomplish its mission were it not for the determination and personal initiative of the individual members (17:4-5).

Furthermore, their ability to use makeshift materials, as evident in several end-of-tour reports cited earlier, was very impressive.

Prime BEEF and Natural Disaster Response

Facility maintenance and repair requirements are not generated by man-made conflicts only. With little warning, natural disasters can inflict serious damage on both military and civilian facilities. AFCE Prime BEEF has been successfully used to combat the effects of natural disasters on facilities. A sampling of AFCE Prime BEEF's response to natural disaster is examined by looking at two such experiences: Hurricane Betsy and the Alaskan Flood.

Hurricane Betsy. The first natural disaster to involve the newly organized Prime BEEF program was Hurricane Betsy which struck in September 1965 (2:18). The site was Homestead AFB, and outside assistance was required for base recovery operations (2:18). Consequently, the Eighth Air Force Directorate of Civil Engineering at Westover AFB, Massachusetts, mobilized a Prime BEEF team which consisted of 91 people of various trades from nine Eighth Air Force bases (2:18). This composite Prime BEEF team was integrated into the Civil Engineering Squadron shops at Homestead AFB within 36 hours (2:18).

The accomplishments of Prime BEEF and on-station Civil Engineering personnel were impressive. Hurricane Betsy destroyed 150 roofs and blew out electrical power, but within three days all the roofs were at least temporarily repaired preventing further property damage, and electrical

power was completely restored (2:19). To restore electrical power,

> Nine transformers and 40 poles required immediate replacement and each of the lines and their complementary poles in the base power distribution system were inspected for line and connection failures and broken insulation (2:18-19).

Brigadier General Joseph A. Ahearn (then Captain) assessed Prime BEEF's performance in the aftermath of Hurricane Betsy:

> The Air Force Prime BEEF standards for skill level, number of technicians, equipment authorization, and mobility, proved highly satisfactory for natural disaster recovery requirements (2:19).

Alaskan Flood. During the Alaskan flood of 1967, Air Force Prime BEEF was called upon to help in the recovery of Fort Wainwright, a U.S. Army installation (29:28). The Air Force's aid was requested because 200 Air Force families were housed on Fort Wainwright and the Army's post engineer forces were committed to assisting the city of Fairbanks, Alaska (29:28). Another significant factor, however, was that ". . . the U.S. Army did not have sufficient mobile military units available with personnel in the quantities or skills needed to effect such a rapid recovery (29:28). Prime BEEF provided this mobile force with both the quantities of personnel and the skills required.

As in other Prime BEEF deployments, a composite type team was used (29:28). In this case, however, Headquarters Alaskan Air Command (AAC), due to the nature of the damage

specified the composition of the Prime BEEF team (a 152-man composite team), but not without concern about using a composite team (29:28). Chief Master Sergeants Sweat and Keats stated that

> This marked a departure from the normal practice of deploying entire "C" teams and Hq AAC had some misgivings about how a composite team composed of relative strangers from various bases would perform. However, their fears proved groundless (29:28).

This "concern" is interesting because in Vietnam composite teams were used regularly. As in Vietnam, the composite Prime BEEF team approach performed satisfactorily.

> When the composite (CONUS) Prime BEEF team arrived at Ft. Wainwright, 23 and 26 August 1967, there had been no electricity, heat, water or sewage facilities in all of post housing and most of the installation for a period of 12 days. Checkout and repairs to runway lights were completed on the first day and to approach lights on the second day. In addition, a number of strobe lights and numerous runway and taxiway light globes were replaced. . . .
>
> . . . Electric power was restored to the 1,430 family housing units by the third day (29:28-29).

Prime BEEF's Report Card in Natural Disasters

Again, as was true for the Vietnam deployments, the organizational structure of Prime BEEF had prepared AFCE members for mobility. They were ready to respond to the source of trouble, whether it was as far north as Alaska or as far south as Florida. The Prime BEEF members responded quickly to natural disasters and effectively carried out repairs to the damaged facilities.

Unlike the Vietnam teams, these teams were large composite teams and were involved in short-term missions. This large concentrated effort enabled them to restore damaged facilities in minimal time. It must also be noted that adequate materials and equipment contributed to their success. Again, Prime BEEF prepared AFCE to respond to emergencies quickly and competently.

V. Conclusions and Recommendations

Introduction

The goal of this research was to examine the initial organizational structure of Prime BEEF and synthesize from its history any lessons AFCE could learn for possible organizational changes in the future. Within this purview, the lessons learned about flexibility, unit integrity, and logistics supportability are important and discussed below.

Flexibility

The Prime BEEF program initially implemented was not designed for flexibility. Structured and rigid teams were established which specified both numbers of people and specific skills. This regimented Prime BEEF approach, however, was never used.

Specialized projects requiring concentrations of specific skills presented problems for the formal Prime BEEF structure, as was evident in Vietnam. For example, the large plumbing and electrical projects required by the nature of the contingency, made an entire BEEF team unsuitable. There would have been too few plumbers or too few electricians.

Although originally Prime BEEF was not designed for flexibility, it was modified quickly to meet the unique requirements of Vietnam. Small composite teams, approximately 30 to 50 men, were assembled on an ad hoc

basis to provide support to the Vietnam Base Civil Engineering organizations. As Chapter IV shows, these composite teams achieved singular success.

The organizational structure of Prime BEEF cannot be faulted in regards to flexibility. AFCE apparently set up Prime BEEF with the support of bare bases or a major intercontinental conflict in mind. Both cases would require a large number of AFCE personnel with a diversity of skills. The Vietnam conflict, however, presented unexpected problems for AFCE, problems not anticipated by the Project Prime BEEF study group. To the credit of AFCE leaders, they realized that the plan had to be modified. Smaller composite teams were assembled. These hybrid teams worked well in Vietnam, as the extensive list of their accomplishments attests.

For the individual civil engineering airman, the Prime BEEF concept increased the flexibility by preparing AFCE members for mobility. Whether they deployed with a structured team or not, the idea and mechanics of maintaining facilities on a worldwide basis was not new to them.

Flexibility Lessons Learned. AFCE should design an organizational structure that will meet the most likely scenario, but we should not design it so rigidly that it can not be readily adapted to other possibilities. As it turned out, the original Prime BEEF organizational structure could be forced into this flexibility.

Unit Integrity

The Prime BEEF organizational structure as planned incorporated unit integrity. BEEF teams were supposed to deploy as BEEF teams, not as individual airmen. Since the BEEF team members worked daily with each other in their parent BCE squadron, they were familiar with each other. They knew each other's strengths and weaknesses. When it came time for deployment, the original design would probably have deployed them together in the same aircraft. Unit cohesion was promoted by this organizational structure.

In Vietnam, however, composite Prime BEEF teams were used regularly. Individual Prime BEEF members were deployed from various bases in numerous aircraft arriving at their end location at different times. Often, they met their "fellow" Prime BEEF team members for the first time at the deployment location. The end-of-tour reports reviewed in this study considered this use of composite teams along with disjointed transportation scheduling detrimental to unit integrity and effectiveness. The end-of-tour reports unanimously supported some method of transporting all Prime BEEF team members on the same aircraft. They argued that such transportation improved unit cohesion by allowing the composite team members a chance to get acquainted before they reached Vietnam.

Unit Integrity Lessons Learned. AFCE should design a Prime BEEF organizational structure that enhances unit integrity because it promotes both morale and effectiveness.

Logistics Supportability

The shortages of vehicles, construction equipment, and construction materials were major problems for the Prime BEEF teams in Vietnam. The end-of-tour reports often cited logistics problems as one of their main concerns.

Without further research on the entire logistics system used to support the United States forces in Vietnam, it is difficult to ascertain the real cause of these problems. However, some general observations can be made. First, logistics support is critical to AFCE mission success. Without equipment and materials, facility maintenance, repair, or construction cannot be done. Given this criticality, AFCE should always closely work with the logistics community to ensure that AFCE logistics requirements have been planned for. Second, given this critical dependence of AFCE Prime BEEF on logistics support, every effort should be made to prevent the growth of this dependence. We should reduce our vehicle and construction equipment dependence to the minimum. In other words, the organizational structure of Prime BEEF needs to be designed to minimize, not increase dependence on vehicles and equipment. Finally, planners should design logistics support methods for AFCE and Prime BEEF that foster

cooperation, not competition. In Vietnam, Prime BEEF and host Base Civil Engineering organizations were forced to compete for the same resources resulting in lowered productivity.

Logistics Support Lessons Learned. AFCE should design a Prime BEEF organizational structure that is logistically supportable. Cooperation with the logistics community is essential to this effort. To prevent adversarial relationships, the logistics support for AFCE should not require Prime BEEF to compete with other AFCE elements for vehicles, equipment, and materials.

Further Recommendations

This research covers only part of the Prime BEEF story. For further study, the following areas are recommended:

1. The First Prime BEEF Restructuring (1979-1982)
2. The Second Prime BEEF Restructuring (1983-1986)
3. Unit Integrity and Prime BEEF
4. Logistics of AFCE in Vietnam

Finally, AFCE must continue to improve its historical record keeping. Conducting this research was difficult because most of the unit and major command histories were useless. The unit histories provided sketchy information, and the major command histories often neglected AFCE entirely. The recent appointment of an AFCE historian should substantially improve this situation. We must have

an accurate picture if we are to learn worthwhile lessons from the past.

APPENDIX A: Prime BEEF Deployment Authority
(AFR 93-3, para 4b, 15 Mar 71)

(1) BEEF-C, E, F, and LS teams are designated as mobile teams with HQ USAF, Civil Engineering Center (AF/PREC), retaining unilateral authority to deploy these mobile teams or any segment or combination thereof whenever and wherever required. The authority will be exercised through the MAJCOM.

(2) Major commands are delegated authority to deploy their BEEF-C, E, or LS teams or components thereof on an intra-command basis or in support of contingency or operations plan training exercises.

(3) The BEEF-F teams are attached to specific flying units and may precede or move with the flying units whenever they are deployed. Tactical Air Command (TAC) and Military Air Command (MAC) are delegated authority to deploy BEEF-F teams established on TAC or MAC bases respectively, on an intra-command basis or in support of contingency or operations plan training exercises. BEEF-F teams which support tenant flying units may be deployed on an intra-command basis or in support of contingency or operations plan training exercises only when approved by HQ USAF/PREC. Requests by the parent MAJCOM to deploy these teams must contain the coordination of the tenant flying commander. Normally, such approval will be given unless there is valid reason not to, such as an impending deployment of the flying unit.

(4) Authority to deploy BEEF-M teams, if missiles are launched and sites will not be rearmed, will be cited as above for BEEF-C, E, and LS teams.

(5) All intra-command or training deployments must be reported by message to HQ USAF/PREC within 48 hours after deployment. Reporting message will cite the reason for deployment, type of team, team size, team chief, date of deployment, and estimated duration of deployment. An information copy of the deployment message will satisfy this requirement.

APPENDIX B: Factors Bearing on the Problem (Project Prime BEEF: Civil Engineering Manpower and Career Development Study, pages 6-8)

A. The role of the civil engineer has changed to one of Direct Combat support:

(1) For the first time major weapon systems became dependent on Civil Engineering support to get off the ground or to exist in their ground environment until required to perform their basic military functions, i.e., missiles, SAGE, BMEWS, AC&W, etc. Civil Engineering entry into the integral sphere of the weapon systems was generated by a requirement for operation and maintenance of facilities using exotic fuels, critical electric power and sensitive temperature and humidity controls.

(2) Secondly, the complexity of our facilities, as they relate to the weapon system, requires maximum assurance of continuing operation.

B. The civil engineer manpower resource totals approximately 100,000 people which is comprised of 2,000 officers; 41,000 airmen; and 57,000 civilians.

C. The alignment, distribution, and utilization of the force reveals:

(1) No appreciable rapid mobile response capability for Tactical Air, Special Air Warfare, or contingencies. This was demonstrated in the "Berlin Build-Up," Cuba and South Vietnam where the Civil Engineering requirement was met by the random selection of individuals, with unassured skills, from bases all over the command to form emergency "pick-up" teams.

(2) The civilian/military mix has developed without any uniformity between major commands, or between similar type installations within the same major command. For instance, many installations have acquired a complete imbalance of civil engineer airmen while at other installations there are not sufficient civil engineer airmen to assure continuity of essential operations during emergency conditions.

(3) There is little or no relationship between the skills identified for military authorizations and the tasks which this "hard core" resource must perform in its combat support role, i.e., grass mowing, painting, custodial work, trash collection, etc.

(4) The career progression in many areas is inadequate. For example, there are five dead-end career ladders at the 5 level.

(5) The skill level requirements in many cases are not adequate to meet the skill requirements of the job. For example, in several of our basic skills, our airmen Air Force specialty job standards do not spell out the requirement to interpret and accomplish work from plans and specifications.

D. Political Implications: The Air Force has experienced a continuous flow of Congressional inquiries relative to the use of civil engineering manpower resources. The Air Force has not been in a position to provide substantive replies to the satisfaction of members of Congress on the role and use of our military and civilian manpower.

E. At many installations there is an insufficient military capability to provide continuity of essential services under emergency conditions. At other installations there is considerably more military capability than is required for those conditions. Military and civilians are in competition for the top technical and supervisory job and, there is a lack of proper training and career development for both. Because of no single manager at Hq USAF level, the situation is becoming progressively worse.

F. As is common practice in industry, in large consolidated housing developments, and to a more limited extent in municipalities, the Air Force accomplishes maintenance, minor repair of facilities, and operation of utility services at airbases, depots and stations with "in-house" forces. Under normal circumstances this force could consist of civilian residents in the adjacent community. However, the Air Force is a military organization with a war mission, and a certain portion of the force must be military. This is referred to as a civilian/military mix.

G. While skill levels in the civilian/military mix should be comparable for similar duty, the nature of job placement and compensation varies of necessity. Civilians are initially job-placed on basis of previous experience and demonstrated skill, and are compensated on the basis of related hourly wage scales. Military counterparts normally enter the service as basic airmen with little or no background of skilled labor experience. They must be trained at government expense and be compensated on the basis of military pay and allowances fixed by rank, rather than accumulated skill. While rank can only be acquired by attrition in the force, promotions to fill military

vacancies are usually made on the basis of accrued skill. On the contrary, certain higher grade positions in the force may not be occupied by military personnel until they have acquired stipulated levels of military rank. Every effort should be made toward equal opportunity for equal service, but this is most difficult. The civilian advances his career up a single ladder of acquired skill and longevity. The airmen must advance up both a ladder of acquired skill and a ladder of military rank, longevity affecting both to a major degree, but not simultaneously.

H. Further peculiarities in the employment of a civilian/military mix result from "tours of duty." The civilian can enjoy a lifetime career at a single air base. However, military personnel must serve "tours of duty," being transferred from one air base to another on a schedule varying from 12 to 36 months. A certain number of these "tours" must be served at locations outside the continental United States, so that counterparts may return from overseas duty. Since it is almost essential that promotions to vacancies be made from the work force present, the "tour of duty" procedure reduces career potentials in the work force for individual military personnel in comparison to those available to civilian employees. On the other hand, overseas tours being only one-third as long as stateside tours, sufficient military must be employed in the civilian/military mix to preclude every other tour being overseas. This enhances the military career potential in two ways. The length of time that an airman remains under control of a single CONUS command is increased, and by numbers alone it permits a military career ladder to be established in certain specialty areas which could not be justified from the standpoint of wartime necessity.

I. Traditionally the Civil Engineering tasks have been categorized as civilian type crafts. The increased requirement for Civil Engineering skills in the Combat Support area negates this generality. Because of this misconception the military element of the Civil Engineering force is not capable of providing reliable Combat Support.

APPENDIX C: Prime BEEF Deployments in Vietnam 1965-1967 (31:119-120)

The following acronyms will be used in this appendix:

ADC	Air Defense Command
AFSC	Air Force Systems Command
ATC	Air Training Command
DCE	Directorate of Civil Engineering
MAC	Military Air Command
MATS	Military Air Transport Services
POL	Petroleums, Oils, and Lubricants
SAC	Strategic Air Command
TAC	Tactical Air Command

COMMAND/ PERIOD	MEN	LOCATION	PURPOSE	COMPLETE PROJECT COST
ADC Aug-Dec 65	27	Tan Son Nhut	Revetments	$384,000
ATC Aug-Dec 65	23	Bien Hoa	Revetments	330,000
SAC Aug-Dec 65	23	Da Nang	Revetments	450,000
MATS Sep 65-Jan 66	18	Tan Son Nhut	Plumbing	92,000
ADC Oct 65-Feb 66	43	Bien Hoa	General Construction	79,000
AFSC Oct 65-Feb 66	30	Binh Thuy	General Construction	92,000
ATC Oct 65-Feb 66	45	Da Nang	Airmen Dorms	123,000
MAC Oct 65-Feb 66	32	Nha Trang	General Construction	83,000
HEADQUARTERS Oct 65-Feb 66	29	Pleiku	Cantonment Facilities	156,000
SAC Oct 65-Feb 66	46	Tan Son Nhut	General Construction	210,000

COMMAND/ PERIOD	MEN	LOCATION	PURPOSE	COMPLETE PROJECT COST
3 COMMANDS Oct 65-Feb 66	4	9 Bases	POL Facilities	Not listed
MAC Jan-May 66	29	Tan Son Nhut Bien Hoa	Revetments	485,000
ADC Feb-May 66	12	Tan Son Nhut Bien Hoa	Plumbing	33,000
6 COMMANDS Feb-Jun 66	21	Tan Son Nhut	Electrical	57,000
AFSC Feb-Jun 66	30	Tan Son Nhut Binh Thuy	General Construction	60,000
ADC Feb-Jun 66	30	Pleiku	Cantonment Facilities	104,000
ATC Feb-Jun 66	30	Nha Trang	Cantonment Facilities	140,000
TAC Feb-Jun 66	30	Bien Hoa Qui Nhon	General Construction	100,000
SAC Mar-Jul 66	50	Tan Son Nhut	General Construction	102,000
SAC Mar-Jul 66	40	Da Nang	General Construction	96,000
ADC Mar-Jul 66	29	Pleiku Bien Hoa	Revetments	500,000
TAC Mar-Jul 66	29	Da Nang Dong Ha	Revetments	157,000
ADC May-Sep 66	1	Hq, 7AF (DCE)	Chief, Prime BEEF	
6 COMMANDS May-Sep 66	17	Hq, 7AF (DCE)	Staff Functions	
ATC Jun-Oct 66	50	Nha Trang	General Construction	239,000
TAC Jun-Oct 66	50	Bien Hoa Da Nang Qui Nhon	General Construction	188,000

COMMAND/ PERIOD	MEN	LOCATION	PURPOSE	COMPLETE PROJECT COST
SAC Jun-Oct 66	50	Tan Son Nhut	General Construction	202,000
ADC Jun-Oct 66	50	Pleiku	General Construction	246,000
7 COMMANDS Jun-Nov 66	13	Tan Son Nhut	Electrical	53,000
AFSC Jul-Nov 66	20	Da Nang Dong Ha	Cantonment Facilities	140,000
8 COMMANDS Sep 66-Jan 67	16	Hq, 7AF (DCE)	Staff Functions	
4 COMMANDS Sep 66-Jan 67	50	Da Nang	General Construction	*
TAC Sep-Dec 66	1	Hq, 7AF (DCE)	Chief, Prime BEEF	
MAC Oct 66-Feb 67	28	Bien Hoa	Revetments	*
TOTALS	-- 8 Bases 31 Officers 965 Airmen			$4,901,000

* Accomplishments not complete.

APPENDIX D: Prime BEEF Team Accomplishments in Vietnam, 1965-1966 (31:121-129. Reformatted for legibility.)

The following abbreviations/acronyms will be used in this appendix.

ADC	Air Defense Command
AFSC	Air Force Systems Command
ATC	Air Training Command
BX	Base Exchange
CE	Civil Engineering
CY	Cubic Yards
DCE	Directorate of Civil Engineering
EOD	Explosive Ordnance disposal
FT	Feet
LF	Linear Feet
MAC	Military Air Command
MATS	Military Air Transport Services
POL	Petroleums, Oils, and Lubricants
PSP	Pierced Steel Planking
SAC	Strategic Air Command
SY	Square Yards
TAC	Tactical Air Command

Deployment Command/Period: ADC/Aug-Dec 65

Purpose: Armco aircraft revetments at Tan Son Nhut Air Base

Principal Accomplishments

- 4,700 LF revetments 12 FT high, 5 1/2 FT wide
- 11,800 CY fill in revetments
- 36,784 SF steel blast deflector in revetments
- 130,000 SF PSP removed
- 155,000 SF M9M1 matting installed
- 16,720 SF blast fence erected
- 4 acres grubbing, clearing, grading for dormitory construction
- 9,200 SF concrete slabs
- 1 - 20' X 100' 2-story dormitory

Deployment Command/Period: ATC/Aug-Dec 65

Purpose: Armco aircraft revetments at Bien Hoa Air Base

Principal Accomplishments

- 3,800 LF revetments 12 FT high, 5 1/2 FT wide
- 9,500 CY fill in revetments
- 30,096 SF steel blast deflector in revetments
- 2,666 SY concrete shoulders
- 1,400 LF drainage ditches adjacent to aircraft parking apron
- 1 - POL bladder revetment

Deployment Command/Period: SAC/Aug-Dec 65

Purpose: Armco revetments at Da Nang Air Base

Principal Accomplishments

- 3,540 LF revetments 12 FT high, 5 1/2 FT wide
- 9,850 CY fill in revetments
- 1,500 LF shoulder stabilization
- 3,333 SY concrete ramp for bomb storage
- 1,222 SY PSP ramp for O-1E aircraft
- 8,888 SY PSP hardstands
- 1,200 SF warehouse, wood frame
- 7,250 SF concrete and PSP for trailers

Deployment Command/Period: MATS/Sep 65-Jan 66

Purpose: Plumbing project at Tan Son Nhut Air Base

Principal Accomplishments

- 12,000 LF water mains
- 450 LF sanitary sewer main
- 1,350 LF leeching field lines
- 5 septic tanks
- 9 latrines plumbing
- 2 water pumps
- 1 water purification equipment
- 3 water storage tanks plumbing

Deployment Command/Period: ADC/Oct 65-Feb 66

Purpose: General construction at Bien Hoa Air Base.

Principal Accomplishments

- 1 - 28' X 42' addition to dispensary
- 14 - 16' X 16' addition to dormitories
- 1 - 32' X 96' administration building
- 1 - 32' X 64' security/law enforcement building
- 1 - 44' X 60' warehouse
- 1 - 20' X 60' vehicle maintenance shop
- 1 - 50' X 60' vehicle servicing shop
- 1 - 24' X 60' addition to combat operations center
- 1 - 32' X 70' refueler vehicle maintenance shop
- 3360 SF concrete ramp for refueler vehicle parking
- 1 - 28' X 91' post office
- 1 - 20' X 40' dental clinic
- 900 LF barbed wire fence
- 500 LF 3' wide sidewalks

Deployment Command/Period: AFSC/Oct 65-Feb 66

Purpose: General construction at Binh Thuy Air Base

Principal Accomplishments

- 8 - 24' X 46' airmen dormitories, single story
- 2 - 20' X 32' latrines
- 1 - 32' X 80' library
- 1 - 24' X 80' theater/chapel with 16' X 32' wing
- 1 - 32' X 80' Post Office
- 1 - 32' X 80' enlisted men's club
- 1 - 32' X 80' officers club
- 1 - 12' X 16' portable office
- 460 SY concrete walks and access drives

Deployment Command/Period: ATC/Oct 65-Feb 66

Purpose: Construction of airmen dormitories at Da Nang Air Base

Principal Accomplishments

- 20 - 20' X 100' airmen dormitories, single story
- 1 - 24' X 100' operations building

Deployment Command/Period: MAC/Oct 65-Feb 66

Purpose: Construction of cantonment facilities at Nha Trang Air Base

Principal Accomplishments

- 1 - 20' X 40' airmen dormitory, single story
- 9 - 20' X 50' airmen dormitories, single story
- 4 - 20' X 50' latrines
- 2 - 40' X 100' warehouses (metal)
- 1 - 15' X 40' wood shed
- 4 - 8' X 40' bunker (sandbagged) with wood fra- and metal roof
- 1 - 16' X 16' maintenance shed
- 1 - high intensity runway locators lights system
- 1200 LF runway lighting cable
- 600 LF water main 4"

Deployment Command/Period: III HEADQUARTERS/Oct 65-Feb 66

Purpose: Construction and maintenance of cantonment facilities at Pleiku Air Base

Principal Accomplishments

- 80 - 16' X 32' wood frame tent structures
- 7 - field latrines
- 1 - field shower
- 1 - 16' X 32' generator shed
- 1 - 16' X 20' barber shop
- 1 - 20' X 20' mail room
- 1 - aerial post administration building
- Interior painting and rewiring of 3 - 19' X 42' Vietnamese Air Force barracks for USAF use
- Site preparations for 56 tents
- 152 LF partitions

Deployment Command/Period: SAC/Oct 65-Feb 66

Purpose: General construction at Tan Son Nhut Air Base

Principal Accomplishments

- 2 - 40' X 80' administration building for security services
- 5 - 20' X 100' airmen dormitories, two story
- 2 - 20' X 80' airmen dormitories, two story

- 4 - 24' X 60' airmen dormitories, two story
- 6 - 20' X 32' latrines
- Erected 1 - 6,000 gallon water storage tank
- Constructed 28,300 SY PSP ramp
- Prepared 7,433 site areas for PSP
- Constructed 1 - 60' X 144' concrete slab
- Remodeled 2nd AD Hq offices
- Mixed and placed concrete for generator pads, tank saddles, curbs, septic tanks, etc., total 2700 CY

Deployment Command/Period: 3 COMMANDS/Oct 65-Feb 66

Purpose: Provide capability in POL area, serving air bases in Cam Ranh, Phan Rang, Tuy Hoa, Tan Son Nhut, Bien Hoa, Qui Nhon, Da Nang, and Nha Trang.

Principal Accomplishments

- Development of construction criteria, technical review of designs, assistance with procurement of material, assistance with assembly of POL bladders and dispensing systems, testing of fuel storage tanks, inventories of POL system parts, special designs.

Deployment Command/Period: MAC/Jan-May 66

Purpose: Armco aircraft revetments at Tan Son Nhut Air Base and Bien Hoa Air Base

Principal Accomplishments

- 6140 LF revetments 12 FT high, 5 1/2 FT wide
- 15,000 CY fill in revetments

Deployment Command/Period: ADC/Feb-May 66

Purpose: Plumbing projects at Tan Son Nhut Air Base

Principal Accomplishments

- Plumbing in buildings:
  8 - latrines
  1 - barber shop
  1 - dog kennels
  1 - bachelor officers quarters
  6 - latrines (water heaters)

1 - chapel annex (latrine)
1 - mortuary lab
1 - snack bar
- 2000 LF water main 4"
- Miscellaneous water supply and drains
- 1500 LF water line 2"

Deployment Command/Period: 6 COMMANDS/Feb-Jun 66

Purpose: Minor construction and maintenance of electrical distribution and building (interior) electrical system at Tan Son Nhut Air Base

Principal Accomplishments

- Installed service drops and interior wiring, 44 buildings, i.e., dormitories, offices, latrines, barber shop, dog kennels, post office, air terminal, etc.
- Constructed secondary distribution system in barracks area. Constructed secondary feeder from generator to building in area.
- Constructed secondary distribution system, 1300 LF, in office and shops area. Changed neutral interconnection on transformer bank at Bldg. #500 to remedy technical problem. Constructed secondary distribution system, 600 LF in 7AF compound.

Deployment Command/Period: AFSC/Feb-Jun 66

Purpose: Construction of cantonment facilities at Tan Son Nhut Air Base and Binh Thuy Air Base

Principal Accomplishments

- Tan Son Nhut:
- 5 - 20' X 80' airmen dormitories, two story
- 5 - 20' X 100' airmen dormitories, two story
- Binh Thuy:
- 1 - 20' X 70' ground equipment shop
- 1 - 20' X 60' supply administration building, two story
- 1 - 20' X 40' munitions processing building
- 3 - 24' X 60' airmen dormitories, two story
- 1 - 24' X 60' shop, service station maintenance
- 1 - 24' X 80' auto maintenance administration building
- 1 - 20' X 60' aircraft maintenance control building, two story

Deployment Command/Period: ADC/Feb-Jun 66

Purpose: Construction of cantonment facilities at Pleiku Air Base

Principal Accomplishments

- 2 - 20' X 60' Singapore (steel pre-fabricated) buildings for communications facilities
- 1 - 20' X 67' mess hall addition
- 1 - 8' X 8' hydrogen generator building
- 1 - 15' X 22' communication building
- 6 - 16' X 32' tent frames
- 1 - 24' X 80' special service building with 12' X 30' covered porch
- 1 - 14' X 47' shop addition to hangar
- 1 - 30' X 60' post office
- 4 - ammunition storage shelters
- 1 - 33' X 70' chapel
- 1 - 20' X 60' administration building
- 3000 LF water main 4"

Deployment Command/Period: ATC/Feb-Jun 66

Purpose: Construction of cantonment facilities at Nha Trang Air Base and Da Nang Air Base

Principal Accomplishments

- Nha Trang:
- 6 - 20' X 100' airmen dormitories, two story
- 1 - 20' X 156' operations maintenance building, concrete slab only
- 1 - 30' X 156' operations maintenance building, two story
- 1 - 30' X 60' fire station annex, two story
- 1 - 40' X 100' munitions maintenance building, concrete slab only
- Da Nang:
- 10 - 7' X 9' latrines
- 5 - 20' X 100' airmen dormitories, two story
- 1 - 10' X 30' shed

Deployment Command/Period: TAC/Feb-Jun 66

Purpose: Construction of cantonment facilities at Qui Nhon Air Base and Bien Hoa Air Base

Principal Accomplishments

- Qui Nhon:
- 2 - 20' X 40' dormitories, single story
- 2 - 20' X 40' dormitories, two story
- 1 - 15' X 30' latrine
- 1 - water well pipe line
- Bien Hoa:
- 9 - 20' X 60' pre-fabricated metal buildings for civilian personnel office, CE storage, rations storage, etc.
- 1 - 28' X 60' concrete slab for one story building
- 1 - 30' X 80' kitchen, officers mess

Deployment Command/Period: SAC/Mar-Jul 66

Purpose: Construct miscellaneous buildings at Tan Son Nhut Air Base

Principal Accomplishments

- 10 - 20' X 60' pre-fabricated metal buildings
- 1 - 20' X 60' wood frame building
- 1 - 20' X 40' addition to building
- 1 - latrine (plumbing only)
- 3 - latrines (interior partitions only)

Deployment Command/Period: SAC/Mar-Jul 66

Purpose: Construct miscellaneous buildings at Da Nang Air Base

Principal Accomplishments

- 1 - 80' X 100' engine shop, metal
- 1 - 40' X 100' airmen dormitory, two story
- 7 - 20' X 48' Quonset for administration communication storage, communication maintenance, POL labs, finance, air rescue operations, etc.
- 1 - 40' X 80' headquarters
- 1 - 25' X 15' library addition
- Interior electric in two existing buildings

Deployment Command/Period: ADC/Mar-Jul 66

Purpose: Construct aircraft revetments at Pleiku and Bien Hoa Air Base

Principal Accomplishments

- Pleiku:
- 2,940 LF revetment 12 FT high, 5 1/2 FT wide
- 2,287 CY fill in revetments
- Bien Hoa:
- 3,690 LF revetments 12 FT high, 5 1/2 FT wide
- 2,870 CY fill in revetments
- 478 LF POL revetment

Deployment Command/Period: TAC/Mar-Jul 66

Purpose: Construct aircraft revetments at Da Nang Air Base and Dong Ha Site

Principal Accomplishments

- 2,190 LF revetments 12 FT high, 5 1/2 FT wide
- 2,074 CY fill in revetments
- 22 - trailers, quarters (assembly)
- 113 SY concrete slabs

Deployment Command/Period: ATC/Jun-Oct 66

Purpose: Construct base facilities at Nha Trang Air Base

Principal Accomplishments

- 14 - metal/wood frame single story buildings, 25,900 SF
- 8 - 20' X 48' Quonset
- 1 - 20' X 150' dog kennel
- 1 - 40' X 96' BX snack bar
- 1 - 20' X 144' storage shed
- 1 - 30' X 200' vehicle maintenance shed
- 8 - metal/wood frame two story buildings, 65,000 SF
- 1 - 40' X 100' BX kitchen
- 1 - 30' X 150' operations and maintenance building
- 1 - 30' X 60' fire department dormitory
- 1 - 40' X 100' munitions maintenance building
- 1 - 40' X 150' personnel building
- 1 - 40' X 150' finance building

- 1 - 40' X 110' dormitory
- 1 - 30' X 60' bachelor officers quarters

Deployment Command/Period: TAC/Jun-Oct 66

Purpose: Construct base facilities at Bien Hoa, Da Nang, and Qui Nhon Air Bases

Principal Accomplishments

- Bien Hoa:
- metal/wood frame single story, 30,784 SF
- Da Nang:
- 1 - modular 100 bed hospital, 16,000 SF
- 220 LF POL revetment
- 920 SF concrete ramp
- Qui Nhon:
- 7 - interior wiring of barracks
- 1 - addition to mess hall

Deployment Command/Period: SAC/Jun-Oct 66

Purpose: Construct various buildings at Tan Son Nhut Air Base

Principal Accomplishments

- 1 - 40' X 100' metal Singapore building
- 1 - 40' X 100' metal Singapore building (wood sided CE shop)
- 3 - 60' X 120' metal Butler building warehouses
- 1 - 40' X 100' metal Butler building, two story

Deployment Command/Period: ADC/Jun-Oct 66

Purpose: Construct various buildings at Pleiku Air Base

Principal Accomplishments

- 15 - metal/wood frame, single story buildings, 33,336 SF
- 620 LF POL revetment
- 5 - 20' X 60' BX, POL administration, BX warehouse, CE material control, auto administration
- 1 - 60' X 100' CBPO/finance/library
- 1 - 46' X 60' ammunition administration
- 1 - 20' X 32' latrine with septic tank

- 1 - 40' X 60' parachute tower shop
- 1 - 30' X 66' fire station
- 1 - 20' X 84' snack bar
- 1 - 22' X 25' kennels with septic tank
- 1 - 20' X 40' publication building
- 1 - 36' X 100' CE administration
- 1 - 30' X 72' dental clinic

Deployment Command/Period: 7 COMMANDS/Jun-Nov 66

Purpose: Upgrade electrical distribution system at Tan Son Nhut Air Base

Principal Accomplishments

- Extend primary and secondary distribution transformer banks (3)
- Rewired 4 warehouses and airmen's mess
- Replaced 6 concrete poles

Deployment Command/Period: AFSC/Jul-Nov 66

Purpose: Construct various buildings at Da Nang Air Base and Dong Ha Site

Principal Accomplishments

- Da Nang:
- 3 - air supported shelters, 14,795 SF
- 1 - Quonset administration building, 960 SF
- 1 - 130,000 gallons bolted steel water tank
- 1 - 1200 SF of concrete sills for hospital
- Dong Ha:
- 12 - Quonset (10 dormitories, 1 shop, 1 administration building) 22,080 SF
- 800 LF of 8" sewage collection system
- 728 cubic feet septic tank

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UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

AD-A187 294

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution unlimited.
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) AFIT/GEM/LSR/87S-17	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION School of Systems and Logistics 6b. OFFICE SYMBOL (If applicable) AFIT/LSM	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code) Air Force Institute of Technology (AU) Wright-Patterson AFB OH 45433-6583	7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING / SPONSORING ORGANIZATION 8b. OFFICE SYMBOL (If applicable)	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
See Box 19

12. PERSONAL AUTHOR(S)
Ronald D. Marlin, B.S., Captain

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
MS Thesis	FROM _____ TO _____	1987 September	95

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	History, Civil Engineering, Military Engineering, Vietnam
13	02		
05	06		

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Title: AN HISTORICAL DEVELOPMENT OF THE ORGANIZATIONAL STRUCTURE OF AIR FORCE CIVIL ENGINEERING PRIME BASE ENGINEER EMERGENCY FORCES (BEEF) FROM 1964 TO 1978

Thesis Chairman: Dr. Freda F. Stohrer
Associate Professor of Technical Communication

Approved for public release: IAW AFR 190-1.
LYNN E. WOLAVER 24 Sept 87
Dean for Research and Professional Development
Air Force Institute of Technology (AFIT)
Wright-Patterson AFB OH 45433

20. DISTRIBUTION / AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☑ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS	UNCLASSIFIED

22a. NAME OF RESPONSIBLE INDIVIDUAL	22b TELEPHONE (Include Area Code)	22c. OFFICE SYMBOL
Dr. Freda F. Stohrer	(513) 255-2820	AFIT/LSR

DD Form 1473, JUN 86 — Previous editions are obsolete — SECURITY CLASSIFICATION OF THIS PAGE

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Abstract

This thesis provides a detailed history and analysis of the organizational structure of Air Force Civil Engineering (AFCE) Prime Base Engineer Emergency Forces (BEEF) from its beginning in 1964 to its first restructuring in 1978. The research covers both primary and secondary documents on AFCE. The findings are presented in four chapters: 1) the rationale behind the Prime BEEF organizational structure as defined by the factors considered by the Project Prime BEEF study group is discussed; 2) the structure and mission of each of the five Prime BEEF teams is outlined; 3) the experiences with the Prime BEEF organizational structure in Santo Domingo, Vietnam, and selected natural disasters are described and analyzed; and 4) the conclusions and lessons learned are presented. Following a summary of recommendations, the results that AFCE planners design a Prime BEEF organizational structure which allows for flexibility, logistics supportability, and unit integrity are presented. Theses,